WHAT IS CLAIMED IS:

1. Controller circuitry that detects polarity reversals in a read/write head of a disk drive system, the controller circuitry comprising:

decoding circuitry for decoding a direction signal to provide a decoded signal, wherein the direction signal is generated by the read/write head in response to reading a directional pattern stored on a data track of a magnetic disk; and

comparing circuitry for determining if the decoded signal matches a first pattern that indicates whether the read/write head have reversed polarity.

2. The controller circuitry of claim 1 wherein the comparing circuitry includes a plurality of AND gates that compare the first pattern to the decoded signal.

3. The controller circuitry of claim 2 wherein:

a tolerance between the first pattern and the second pattern is 8 bits.

4. The controller circuitry of claim 1 wherein the decoding circuitry includes an amplifier that amplifies differential read signals from the read/write head to generate an amplified read signal, a buffer that converts the amplified read signal into differential digital signals, and an exclusive OR gate that is coupled to receive the differential digital signals.

5. The controller circuitry of claim 4 wherein the exclusive OR gate performs an exclusive OR function on a first one of the differential digital signals generated in a current clock cycle and a second one of the differential digital signals generated in a previous clock cycle.

6. The controller circuitry of claim 1 wherein the direction patterns are written in regions of the data track that precede each servo sample.

7. The controller circuitry of claim 1 wherein the first pattern is 11011.

8. A disk drive system for reading magnetic recording media, the disk drive system comprising:

a read/write head that includes a read sensor for reading data written onto data tracks on the magnetic recording media and generating a read signal, wherein the read sensor reads direction patterns stored in regions of the data tracks; and

decoder circuitry for decoding the read signal to generate a decoded read signal and comparing the decoded read signal to a pattern to determine if the read/write head has reversed polarity,

wherein the disk drive system reverses a polarity of the read signal if a portion of the decoded read signal matches the pattern, and the portion of the decoded read signal is generated in response to reading one of the direction patterns.

9. The disk drive system as defined in claim 8 wherein the decoder circuitry includes a plurality of AND gates that compare the decoded read signal to the pattern to determine whether the read/write head has reversed polarity.

10. The disk drive system as defined in claim 9 wherein the decoder circuitry includes a shift register coupled to inputs of the AND gates.

11. The disk drive system as defined in claim 8 wherein the decoding circuitry includes:

an amplifier for amplifying the read signal to generate an amplified signal;

a buffer for generating differential digital bits in response to the amplified signal;

two sets of shift registers for storing the differential digital bits; and

an exclusive OR gate coupled to two of the shift registers.

12. The disk drive system as defined in claim 11 wherein the exclusive OR gate performs an exclusive OR function on a first differential digital bit generated at a positive output of the buffer in a current clock cycle, and a second differential digital bit generated at a negative output of the buffer in a previous clock cycle.

13. The disk drive system as defined in claim 8 wherein the direction patterns are stored on the magnetic recording media before servo samples.

14. The disk drive system as defined in claim 8 wherein the pattern is 11011.

15. A disk drive system for reading magnetic recording media, the disk drive system comprising:

means for writing direction patterns on data tracks of a magnetic disk and reading the direction patterns to generate a polarity signal;

means for determining if the polarity signal matches a first pattern; and

means for reversing the polarity of signals generated by reading data on the data tracks if the polarity signal matches the first pattern.

16. The disk drive system as defined in claim 15 wherein the means for determining compares the polarity signal to a second pattern that indicates the means for writing and reading has not reversed polarity.

17. The disk drive system as defined in claim 16 wherein a tolerance between the first pattern and the second pattern is 8 bits.

18. The disk drive system as defined in claim 15 wherein the means for determining comprises:

means for generating differential digital bits in response to the polarity signal; and

means for performing an exclusive OR function on the differential digital bits.

19. The disk drive system as defined in claim 18 wherein the means for performing the exclusive OR functions performs the exclusive OR function on a first differential digital bit generated in a current clock cycle and a second differential digital bit generated in a previous clock cycle.

20. The disk drive system as defined in claim 15 wherein the first pattern is 11011.